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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/608,233	06/30/2003	Martin E. Fermann	A8596	1753
7590	02/28/2005			
SUGHRUE MION, PLLC 2100 Pennsylvania Avenue, NW Washington, DC 20037-3213			EXAMINER HELLNER, MARK	
			ART UNIT	PAPER NUMBER
			3663	

DATE MAILED: 02/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

 <b>Office Action Summary</b>	<b>Application No.</b> 10/608,233	<b>Applicant(s)</b> FERMANN ET AL. 	
	<b>Examiner</b> Mark Hellner	<b>Art Unit</b> 3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-50 is/are pending in the application.  
     4a) Of the above claim(s) 12-14, 42 and 43 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6, 10, 11, 15-30, 39, 40, 44 and 48-50 is/are rejected.
- 7) ☒ Claim(s) 5, 7-9, 31-38, 41 and 45-47 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 June 2003 and 27 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>10272003</u> . | 6) <input type="checkbox"/> Other: ____.  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Perry et al in view of Harter et al.

Perry et al disclose a chirped (ultrashort) pulse amplification system comprising: a pulse stretcher (12) that produces pulse having a duration longer than 100 ps, 300 ps or 1 ns; at least one amplifier (14) following the pulse stretcher; and a pulse compressor (16) compressing the pulses by a factor greater than 50 or 150.

The difference between claims 1-3 and Perry et al is that a fiber Bragg grating be used as the pulse stretcher (12).

Harter et al is cited to show that fiber Bragg gratings were known at the time of the present application to have been used for pulse stretching in the same type of structure disclosed by Perry et al.

Motivation to use a fiber Bragg grating for element (12) is provided by column 5, lines 38-60 of Perry et al.

The amplifier (14) of Perry et al directly teaches claim 4.

Claim 6 is taught by element (16) of Perry et al.

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Claims 5 and 7-9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harter et al in view of Zweiback et al.

Harter et al disclose a chirped pulse amplification system (figure 7) comprising: a seed pulse source (input to DCF) producing short optical pulses having an inherent spectral bandwidth; a chirped fiber Bragg grating pulse stretcher (720); an amplifier (730) following the stretcher; and a compressor (760) for recompressing the stretched pulses.

The difference between Harter et al and the subject matter of claims 1 and 2 is the function that the Bragg grating stretcher exhibit a group delay ripple of less than 10 ps within the spectral bandwidth of the seed pulse source.

Figure 3D of Zweiback et al is cited to show that group delay ripple is a function of how well a fiber Bragg grating is manufactured. Figure 3D also teaches that a group delay ripple of less than 10 ps was obtainable in a fiber Bragg grating at the time of the present application.

It would have been obvious to a person of ordinary skill in the art that the use of the best possible fiber Bragg grating in the Harter et al invention would have produced the best results. The teaching of Zweiback et al shows that this grating would have had a group delay ripple less than 10 ps.

Claims 15-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stock et al in view of Harter et al.

Stock et al disclose a device for generating ultra-short pulses comprising: a seed pulse source (10) for producing short pulses; a stretcher (10) for stretching the pulses; and a section of predominantly polarization maintaining fiber (30, column 7, lines 5 and 6).

The difference between claim 15 and Stock et al is that part of the polarization maintaining fiber also be an amplifier.

Harter et al teaches that it was beneficial to amplify (730) part of the fiber section leading from a pulse stretcher to a pulse compressor in order to improve the output of a ultra-short pulse generator.

It would have been obvious to have applied the teaching of Harter et al to the device of Stock et al when seeking to improve the quality of pulses generated, thus producing claim 15.

Claims 16-19 recite notoriously well known properties of polarization maintaining fibers and, as such, would have been suggested by element (30) of Stock et al.

Claims 20-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Perry et al in view of Harter et al.

Parent claim 3 is rejected for the reasons given in the 35 USC 103 rejection of claims 1-4 and 6 set forth above on page 1 of this action.

Claims 20-23 recite the properties and elements that were notoriously well known to the skilled artisan to be part of a cladding pumped amplifier.

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Harter et al teaches using a cladding pumped amplifier (30a) to amplify pulses in a chirped pulse amplification system.

Column 5, line 63 of Perry et al indicates that alternatives to the regenerative amplifier disclosed as the preferred embodiment were acceptable at the time of the present application, thus providing for the alternate substitution of the cladding pumped amplifier disclosed by Harter et al which was taught as workable in the same environment.

Claim 24 is rejected for the reasons applied to claims 1-4 and 6 in the 35 USC 103 rejection set forth above on page 1 of this action.

Claims 25-28 recited properties that were notoriously well known to a person of ordinary skill in the art to have been a part of a fiber grating compressor at the time of the present application.

The use of a fiber grating compressor is clearly suggested by element (760) of Harter et al.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 29 and 30 are rejected under 35 U.S.C. 102(b) as being anticipated by Galvanauskas et al (6,198,568).

Figure 5(b) of Galvanauskas et al teach a chirped pulse amplification system comprising: a short pulse seed source (5); a fiber grating pulse stretcher (26); an adaptive pulse shaper (27); at least one amplifier (50); and a pulse compressor (40).

The structure recited above reads on claim 29 and 30.

Claims 31-38 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Perry et al in view of Harter et al.

Claim 39 is rejected for the reasons applied to claims 1-4 and 6 in the 35 USC 103 rejection set forth above on page 1 of this action.

Claim 40 is rejected under 35 U.S.C. 102(b) as being anticipated by Harter et al.

Harter et al teach a chirped pulse amplification system comprising : a non-linearly chirped fiber Bragg grating pulse stretcher (720) ; at least one fiber amplifier (710) following the stretcher and having a step index profile ; and a pulse compressor (760) for compressing the stretched pulses.

Claims 49 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harter et al.

The bulk compressor elements recited by claims 49 and 50 were notoriously well known to the skilled artisan to performed the same function as the compressor (760) disclosed by Harter et al and, as such, would have been a logical substitution when considering cost and availability of parts.

Claims 41 and 45-47 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 48 is rejected under 35 U.S.C. 102(b) as being anticipated by Galvanuaskas et al (5,847,863).

Galvanauskas et al disclose a chirped pulse amplification system (figure 7) comprising: a fiber Bragg grating pulse stretcher system including a plurality of fiber Bragg gratings (710, 715), each of which is designed to stretch a separate spectral component of an input pulse; at least one optical amplifier (OPTICAL AMPLIFIER) following the stretcher; and a pulse compressor (705) for compressing and reconstructing the stretched pulses by incoherent addition.

Any inquiry concerning this communication should be directed to Mark Hellner at telephone number 703 306 4155.

Mark Hellner

Primary Examiner

AU 3663

A handwritten signature in black ink that reads "Mark Hellner". The signature is written in a cursive, flowing style with a long horizontal tail stroke.